

CONNECTOR ARRANGEMENT

CROSS REFERENCE

[0001] This patent application is a continuation application of U.S. patent application Ser. No. 14/825,598, filed Aug. 13, 2015, the disclosure of which is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0002] The exemplary and non-limiting embodiments of the invention relate generally to connectors or connector arrangement that can be employed to interconnect radiofrequency apparatuses or components. Embodiments of the invention relate especially to coaxial connector arrangements that can be employed in radio frequency apparatuses.

BACKGROUND

[0003] The following description of background art may include insights, discoveries, understandings or disclosures, or associations together with disclosures not known to the relevant art prior to the present invention but provided by the invention. Some of such contributions of the invention may be specifically pointed out below, whereas other such contributions of the invention will be apparent from their context.

[0004] Connectors are used in radiofrequency apparatuses to connect apparatuses or components within an apparatus electrically to each other. For example, a typical arrangement in connecting a power amplifier of a radio transmitter to an antenna arrangement is to use a cable comprising connectors at the both ends of the cable. The cable with the connectors provides the radio frequency signal produced by the power amplifier a path to the antenna. Connectors are typically attached by small screws or press fittings to radio module housing and the radio is connected to antenna by using different length of jumper cables. Similar arrangement may be used within a radio transmitter when the output signal of a filter is led to the power amplifier of the radio transmitter, for example.

[0005] A common problem with prior art connecting solutions is that there are many connection joints between different radiofrequency parts and that can generate passive intermodulation or other electrical/mechanical contact problems.

SUMMARY

[0006] In one exemplary embodiment, a connector arrangement comprises: an attaching portion configured to receive a first object; a spring-loaded bed disposed in the attaching portion, the spring-loaded bed configured to couple the attaching portion to the first object and to enable movement of the connector arrangement in relation to the first object in at least two different directions; an outer connector depending from the attaching portion; and an inner connector disposed in the outer connector and having a first end extending through the spring-loaded bed and into the attachment portion and having a protruding element at a second end thereof extending into the outer connector. The outer connector depending from the attaching portion is configured to make a contact with an outer connector on a second object to form a first conductive signal path from the outer connector depending from the attaching portion to the outer connector on the second object. The protruding ele-

ment is configured to make a contact with a cavity in the second object to form a second conductive signal path from the inner connector to the cavity in the second object. The connector arrangement has no internal locking mechanism to provide mechanical stability for the conductive signal path.

[0007] In another exemplary embodiment, a connector arrangement comprises: a connector comprising an outer connector, an inner connector with a protruding element, and a spring-loaded bed for attaching the connector to a first object, the connector being movable in relation to the first object in at least two different directions. The outer connector is configured to attach the connector to a second object. The outer connector configured to attach the connector to the second object forms a first conductive signal path from the outer connector to an outer connector of the second object. The inner connector with a protruding element forms a second conductive signal path from the inner connector to a cavity of the second object. The connector arrangement has no internal locking mechanism to provide mechanical stability for the first and second conductive signal paths.

LIST OF DRAWINGS

[0008] Embodiments of the present invention are described below, by way of example only, with reference to the accompanying drawings, in which

[0009] FIG. 1 illustrates an example of an arrangement where embodiments of the invention may be applied;

[0010] FIGS. 2A, 2B, 2C and 2D illustrate examples of connector arrangements;

[0011] FIGS. 3 and 4 illustrate an example of a connector arrangement;

[0012] FIG. 5 illustrates the guiding means and floating connection; and

[0013] FIGS. 6 and 7 illustrate another example of a connector arrangement.

DESCRIPTION OF SOME EMBODIMENTS

[0014] The following embodiments are only examples. Although the specification may refer to “an”, “one”, or “some” embodiment(s) in several locations, this does not necessarily mean that each such reference is to the same embodiment(s), or that the feature only applies to a single embodiment. Single features of different embodiments may also be combined to provide other embodiments. Furthermore, words “comprising” and “including” should be understood as not limiting the described embodiments to consist of only those features that have been mentioned and such embodiments may also contain also features, structures, units, modules etc. that have not been specifically mentioned.

[0015] FIG. 1 illustrates an example of an arrangement where embodiments of the invention may be applied. The figure shows an antenna 100 and a radio part 102. The radio part 102 and the antenna 100 are connected together using fastening means 104A, 104B. (Corresponding two fastening means on the other side of the radio part are not shown for clarity). It may be noted that illustrated fastening means are only an example. The number and style of the fastening means may vary. The radio part 102 typically comprises a transceiver or transmitter configured to transmit using the antenna 100. The signal to be transmitted is amplified in a power amplifier of the transceiver or transmitter from which